DATA PROCESSING DIGEST

A SERVICE OF CANNING SISSON AND ASSOCIATES

© Canning, Sisson and Associates, 1956

LUME 2 NUMBER 9 | 914 SOUTH ROBERTSON BOULEVARD • LOS ANGELES 35, CALIFORNIA | SEPTEMBER, 1956

LIBRARY OF THE
OCT 10 1956
UNIVERSITY OF ILLINOIS

General Information

"The responsibilities of management by electronics"

General E. W. Rawlings, Com., USAF–AMC
ARMED FORCES MANAGEMENT, July 1956; pages 5–8.

Firm leadership, long–range vision

The use of electronics forces upon management the realization that "management, no less than the work force, must make a significant re-adjustment to these new techniques." Six responsibilities of management are listed:

1– "Top eschelons of management...must believe in [the electronic machines] and be sufficiently informed about them to give a steady and strong impetus at all levels. This drive must carry middle management by influence and operational levels by specific education.

"There can be no substitute for this vital element of personal leadership, for electronic data processing is a major shift in direction. It cannot be taken for granted, pushed by the normal momentum of accumulated experience. It is a break with the past which involves changes of familiar patterns, the irritant of adjustment to something new."

2– "Management must consciously give a new weight to long–range focus--in establishing and maintaining the research activities essential to realize the full potentialities of these systems and make them pay their way in lowered unit costs of data processing. If we attempt indefinitely to graft the new techniques to pre–electronic processing, we are going to glean only a fraction of the harvest from this equipment. The immediate advantages of speed and accuracy which they offer when harnessed to the existing systems, can be a snare for management, tempting them to invest their total EDPD resources in their 'quick payoff.' "

3– "Management must get and keep its house in order organizationally during this period of transition to the new techniques." Research and operational functions should not only have good communications between them, but their work must be coordinated through a centralized control

point "which can weigh and synchronize the various elements in the program, prevent duplications...and act as a clearing house for the increasing practical experience gained on the equipment." Moreover, the equipment "should operate as centrally and impartially as the heart of a body, receiving data from all parts of the body, processing it and making it available to all elements for withdrawal of their particular sustenance. If we are to allow effective scope for the advantages inherent in this across-the-board sweep, directive control must be centralized at a point independent of specialized organizational interests and over-looking the total mission as a complete entity."

4– "The establishment of procedural disciplines which will insure the ability of the operating levels to learn progressively from their own experience....Units in the field should be regularly apprised of the degree of accuracy of the data supplied by them for processing; they should be intelligently aware of all the factors within their control which contribute to valid results; and they should at all times have a sound basis for judging their areas of deficiency and their progress toward correction."

5– "A new order of creative and progressive personnel policies is absolutely essential to success in the transition to electronics." High quality, properly trained personnel are at a premium at the present. Therefore, management must "establish a policy and definite programs for developing our own people [Armed Forces] to the greatest extent possible, utilizing every transference of skill and training which is applicable....Management has not before faced a comparable responsibility for hewing out its own work force."

6– "Common-sense in the assessment of potentialities and progress." Patient, informed planning, imagination, open-mindedness to experiment, and the willingness to invest exploratory time, money, and manpower are needed to gain the full potential of electronic equipment. Therefore management should be prepared "for a period of parallel operation, of phasing in the new force gradually as we grow surer in our control of it, more experienced in its developing possibilities."

((This brief abstract can touch only the highlights of this excellent article. Management personnel would find the text of the complete article of tremendous help in evaluating their responsibility for the EDP plans of their own organization.))

"Electronic computers and personnel administration"

Lowell H. Hattery, American University
PERSONNEL ADMINISTRATION, March–April 1956; pages 7–13.

Employee relations, job evaluation, training programs

The often-ignored problem of personnel relations in the installing of electronic data processing systems is given a lucid and practical treatment. Not only are the problems presented, but concrete suggestions given for immediate steps toward their solution.

Although the article is concerned with government installations and Civil Service personnel, the points made are equally valuable to business management.

The problems presented, along with their solutions are the following:

1. Fear of displacement, resulting in lowered morale and hasty resignation by all levels of personnel who are affected in some way by the new equipment.

Solution: The Pacific Mutual Insurance Company program of employee relations is given as an outstanding example of eliminating this problem before it arises.

2. Lack of job evaluation, qualifications, standards.

Solution: It is suggested that the Civil Service Commission in particular, and business management in general, speedily set up a program of study, and recommend basic policies in these areas.

3. Inadequate training programs for all levels of personnel, including long-range career planning.

Solution: Training for the individuals affected by the system should be increasingly the task of the employer, and the universities. An important aspect is the stimulation of employees and others to view business electronics as a career.

In all these solutions, "the personnel officer has a responsibility to cooperate with other management officers toward a program to reassure affected personnel, and, more important, to motivate all involved to contribute positively to the success of the new system."

"Trained personnel: key to better data processing"

J. R. Summers, The Texas Co., Houston, Texas
N.A.C.A. BULLETIN, August 1956; pages 1443–1449.

Potential systems professionals must be sought for training

There is a great need for an understanding of the human requirements in utilizing electronic data processing equipment. These requirements are leading toward a methods and systems profession which is of a general nature, but which touches on many specialized fields in the areas of production and operations, accounting and comptrollership, engineering and research. Qualified persons with the skills and personality traits required for such a profession are at a premium. Therefore, it is necessary to train persons who have a potential for the profession.

"The composite mind of the group must grasp the overall perspective of data processing and computing and, at the same time, direct attention to

the detailed requirements of particular problems." Traits which are important are the ability to be analytical, painstaking, inventive, to have "the mental discipline of rigorous mathematical thinking...possess the practical common sense of the business man...the character, stamina, and perseverance of a frontierman, and yet recognize that they are developing their new profession in an environment of already established professional practices, ethics, and social order. This imposes an additional important qualification, that of diplomacy and skill in working with associates in many areas of activities, in many departments, and at all levels of management and supervision."

Specifically, they must know their business, know the machines and equipment they are to work with, and know how to apply these machines to their problems and procedures.

The training of such people is the shared responsibility of companies using or planning to use the equipment, the machine manufacturers, public accounting and management consulting firms, and universities. The company's own training program is of primary importance. This should concentrate on laboratory-type courses on the company's own applications. They should be given "not only to people involved in machine procedure development, programming, and the operation of the installation but also to other groups, i.e., who prepare source material for processing or who use the end results."

Another type of company training needed is the continuing education of the entire organization in the understanding of the new concept of data processing. Included in this continuing program is the examination of present methods and objectives in the light of the new methods and objectives suggested by electronic equipment, and the resulting re-design of systems. With many companies, the installing of electronic equipment is done "in a stepwise manner, first utilizing the smaller and intermediate machines and, finally, where economically justified, graduating to large-scale electronic computing systems. The training aspect is fundamental in such decisions."

"EDP-- A challenge"

Everett S. Calhoun, Stanford Research Institute, Menlo Park, Calif.
Reprint from ELECTRICAL WEST, March 1956

Eight steps for preparation

Management, confused by the many conflicting reports on the values, problems and expenses of installing electronic data processing systems, could profit from this excellent review of the subject. A suggested 8-step schedule of preparation for electronics is given, based on the experience of those who have already gone through the process. The benefits of EDP are summed up in five points. Costs estimates are given for equipment, accessory equipment, location preparation and programming. Design trends are then discussed, suggesting the changes EDP systems will have in the future.

A copy of the reprint may be obtained from the Public Relations Department of Stanford Research Institute, Stanford, California.

"Centralized data processing for decentralized management"

Walter M. Harris, A. O. Smith Corporation, Milwaukee, Wisc.
N.A.C.A. BULLETIN, July 1956; pages 1323–1328.

Audacious use of computer in report preparation for accounting divisions

This company's concept of an electronic data processing system is "that it should be a large-scale system serving all of the functions of the company having data processing or computational problems, i.e., a single system to service the accounting, production control, engineering and other functions." However, the central system will return to the decentralized divisions reports upon which they will perform their own analytical work. "In short, the data processing can be, to a considerable degree, standardized for the different units. Data analysis need not be."

An example of this philosophy at work is given in the description of the processing of piecework time tickets. These will be collected from all the Milwaukee divisions and processed in the same computer routine. The main routine will contain subroutines for the exception processing required for the separate divisions. Periodically, summary information from each basic application retained on tape, will be processed to obtain budget reports and financial reports.

"We find that we will generally have fewer intermediate reports than we now have...because...we can follow the processing to natural conclusions rather than stopping at intermediate points because of the limitations of the equipment. We are preparing the program for each basic application in such a manner that it will allow us to process similar source documents for all of the separate accounting departments at the same time."

These are some of the requirements the company has found in electronic data processing accounting:

"To obtain the maximum benefits of the high speed computer, it is desirable to process as much data as possible in a uniform manner....However, uniformity should not be forced upon the different accounting departments when it would work to their disadvantage. The uniformity which we seek is mostly in document preparation and in work assignment as between the computer center and the related clerical areas."

Volume of data must be obtained for efficient processing. This may be obtained partly through the uniformity of data preparation.

Source document accuracy and completeness are necessary.

The interspersing of operations requiring judgment with those not requiring judgment must be avoided.

There must be a precise statement of rules to be applied in any procedure.

Applications may be combined in processing if the following factors are considered:

1. "Is the same input data used for both the large and small job?"

2. "Do we have satisfactory input and out devices available for the additional operations?"

3. "Is the processing for the small job similar to that of the large job?"

"Under electronic data processing accounting, with the documents from several accounting departments processed in one group, it will not be quite so easy to give the accounting departments individual treatment and it will be more necessary to enforce schedules. So, although the electronic data processing center will be a service department to the various accounting departments, they will not be able (except to a limited degree) to direct its activities. However, this will not detract from the status of the accountant who, because of his new freedom from much of the routine of accounting, will spend more time on the management aspects of his job and will develop more tasks for the electronic data processing center to perform."

"The 'dangers' of waiting for automation"

William Alden and Franklin Wyman, Jr., Automation Management Inc., Westboro, Mass. THE OFFICE, August 1956; pages 12, 15, 16, 19, 20, 23.

Continuous systems study needed

The "dangers" of waiting for automation lie in the implied stagnation of systems study during the waiting period. "Your present operations lose in efficiency and economy if this process of thoroughly charting existing production steps is not a periodic part of the job performance you expect of your operating people. It can and should be accomplished without any major change to automatic equipment. It will reveal improvements which in themselves will pay for the effort expended....If you do not do these things, it may be too late for you to recognize the really practical application of electronic equipment when it appears for your business."

"Sylvania's unique processing center opens at Camillus, New York"

OFFICE MANAGEMENT, August 1956; pages 39, 40, 64–69.

Centralized–decentralized system

The Sylvania communication center is the hub of a network of 18,000 miles of private wire facilities among 71 Sylvania stations across the country. There is room in the office building to house another Univac, and space to enlarge the building in the future. Messages coming into the center are coded so that each one is directed toward the proper receiving station. At the present, incoming teletype messages are converted to punch cards which are used to record the data on magnetic tape. Eventually the punch card step will be eliminated. When full operation is under way, the entire Sylvania payroll will be performed by the center, as well as inventory control, sales accounting, billing, and management reports derived from these functions.

(See DPD, August 1955; page 1.)

"Magnetic Ink Character Recognition"

BANKING, August 1956; pages 65–72.

"Common machine language for check processing"

U. S. INVESTOR, August 4, 1956; pages 8, 9, 37.

Common language for banks

The Technical Subcommittee of the Bank Management Commission (American Bankers Association) makes its report here on the study of common machine language for check handling. The final selection of the committee was magnetic printing of Arabic characters in standard format on all checks. The reasons for their selection of this type of language are given in detail. In quick summary, some of these considerations were: economy of printing, wide tolerances possible, easy readability by the public, accuracy of magnetic reading through any defacement or obliteration.

(See DPD, April 1955; page 2: "Automation of Bank Operating Procedure")

"The care and feeding of the human beings who control the 'giant brains' "

MANAGEMENT METHODS, August 1956; pages 37–41.

Programming department planning

Monsanto and Southern Railway office layouts for their programming departments are shown in four diagrams and six photographs. Both companies found that L–shaped glass partition desk units in groups of two were the best solution to space problems. Southern's experience has been that programmers work better in teams of two; the different viewpoints on a job and the clash of ideas are valuable. The glass partition desks provide sufficient work area and the comparative privacy needed. Individual phones save time, and acoustic tile on ceilings and the top three feet of walls reduce distracting noise.

"Computer programming and coding at the high school level"

Aaron L. Buchman, Hutchinson High School, Buffalo, N. Y.
Association for Computing Machinery, UCLA, August 1956

Senior math students

A course in computer programming and coding is being offered at Hutchinson Central Technical High School in Buffalo, New York. The course runs one term and is open to seniors studying their fourth year of mathematics. The students have built a small automatic one-address computer, and learn to program and code problems for it. Visits are made to industries using electronic computers, and the Cornell Aeronautical Laboratory has cooperated by making their machines available to the students for coding and running problems.

"A proposal for training youngsters in digital computing techniques"

Rollin P. Mayer, MIT Lincoln Laboratory, Lexington, Mass.
Association for Computing Machinery, UCLA, August 1956

Capture their interest early

Research at MIT, sponsored jointly by the Army, Navy and Air Force, has shown that a youngster can derive as much pleasure and benefit from building computers from kits as he can building model airplanes, and that such activity would lead toward interest in a career. It is suggested that electronics companies begin to design and manufacture such kits, and that publishers begin to publish manuals and magazines on electronic computing aimed at grade school levels.

"Choose the computer the company needs"

Monroe M. Koontz, Inland Steel Co., East Chicago, Ind.
N.A.C.A. BULLETIN, July 1956; pages 1317–1322

Cautious approach

The computer philosophy which caused this company to select the IBM 650 was to "have working knowledge of and capacity for utilization of such equipment well enough developed within the organization to make the installation pay its way reasonably soon....Right from the beginning, we [refused] to consider equipment requiring what appeared to be excessively high cost rentals and building alterations."

"Automation in business systems"

Arthur E. Carlson, Washington University
JOURNAL OF MACHINE ACCOUNTING, August 1956; pages 12–14, 26, 27.

Electronics in management

A review is given of the advantages of electronic data processing equipment in business systems, especially in the area of management control.

CORRECTION ...

On page 2 in the August 1956 issue: the special report "Appraisal of Electronic Business Applications," is published by National Office Management Association, as a regular edition of the OFFICE EXECUTIVE, May 1956. The address of NOMA is: 132 W. Chelten Ave., Philadelphia 55, Pennsylvania.

Applications

"A data processing revolution in department store sales accounting"

August J. Carson, Ernst & Ernst, Los Angeles, Calif.
N.A.C.A. BULLETIN, August 1956; pages 1450–1456.

Sales, inventory reports result from point-of-sale tape records

The basic principle of integrated data processing is illustrated in this article: the recording of information at point of origination for automatic reproduction throughout the system. In the department store application described, three-part price tickets are code-perforated in the marking room and attached to the merchandise (so far, only ready-to-wear items are processed in this manner.) When a sale is made, one portion of the sales ticket is removed for use at the point-of-sale recorder, one portion is used for markdown or inventory purposes, the third portion always remains with the article for identification in the event of customer return.

The point-of-sale recorder consists of:

1– A price ticket converter which automatically reads the perforated ticket and transfers price, department and classification to the keyboard for imprinting on the sales check. It also transfers this information plus style number, manufacturer's number, size, color, fabric, and age to the tape perforator.

2– The keyboard unit (with each drawer).

3– The tape perforator which produces five-channel punched tape.

A tape-to-card converter at the central tabulating section converts the paper tape to punch cards for subsequent computing and processing.

The sale is recorded on a three-part one-time snap-out sales check, which the sales clerk inserts in the keyboard unit along with one part of the price ticket. The clerk punches his number and type-of-sale code into the keyboard, then actuates the machine. Date, transaction number, and point-of-sale unit number are automatically recorded by the keyboard unit. The unit figures the subtotal, then the clerk punches in taxes, discounts, etc. The total is printed on the sales check and all information punched in or read by the unit is punched on the paper tape. The unit has controls to prevent the entries being made in improper sequence. Customer name and address are stamped by charga-plate or written manually. The clerk also writes in a description of the items purchased for identification by the customer.

The paper tape is used to produce tab cards from which a variety of records and reports can be compiled: 1) Control figures by point-of-sale recorder stations, 2) Sales analysis data, 3) Inventory control reports.

When inventories are to be taken, the extra copy of the price ticket is removed from each article and run through the converter to obtain a punched tape for conversion to tab cards.

At the present time, customer accounting must still be handled manually because of the lack of a customer's account number. This is a problem which appears to be tied in with the use of the charga-plate and necessitates a system of numbering common to all stores cooperating in the charga-plate system. When this problem is solved, complete automation of sales accounting can be achieved.

"Using a computer to reconcile inventory counts to books"

Frank S. Howell, USAF, Washington, D. C.
N.A.C.A. BULLETIN, June 1956; pages 1223–1233.

Automatic adjustment within limits

The XYZ Corporation found that, although its perpetual inventory records were being satisfactorily processed by its electronic computer system, the use of a computer "had not solved the problem of reconciling such records with the annual physical count." Since the company was already attempting to make the daily input information as accurate as possible, it could be assumed that "most discrepancies between count and records would ultimately be traceable to poor work in the stock bins or to errors in the count." Accordingly, the computer system was set up to 1) automatically adjust reasonable discrepancies between physical count and inventory records and 2) furnish listings of those inventory categories which did not fall within the set limits of discrepancies. The actual amount of the discrepancy is not printed out, "as management is well aware of the tendancy of inventory crews to suddenly 'find' missing material instead of going through the painful process of a recount!"

Management's first step was to study and improve its inventory-taking procedures. "This concentration of interest on the physical count processes was dictated by a lesson bitterly learned in earlier years, to the effect that even the fastest and most modern computer does no thinking of its own, with the result that a single error in the input data may bring about a whole chain of derived errors in the ultimate output."

Although the programming of the inventory count and adjustment procedure was an arduous and time-consuming task, it was simpler than had been anticipated, "probably because the programmer started with an abstract concept of what was to be done, rather than with existing procedures which had to be adapted to the abilities of his equipment."

A brief description is given of the procedures, illustrated with four simplified charts. The XYZ Corporation has found that the new procedures have enabled it "to evaluate its inventory practices, controls and personnel by segments...to determine the areas of strength and those in which aggressive action for improvement is indicated. Intermediate management is provided with information which permits it to evaluate the effectiveness of inventory operations in various departments, and to determine which supervisors are doing the best job of inventory-taking. Most important is the fact that all of the facts about the company's inventory are now available to management with a minimum of cost."

"Streamlining office operations"

C. Robert McBrier, Woodward & Lothrop, Washington, D. C.
Address before Controllers' Congress, June, 1956

Department store IDP

Woodward & Lothrop, a Washington department store, has developed integrated data processing systems for Sales Audit, Accounts Payable, and Payroll. Resulting data is then used by the Statistical Department to obtain more accurate and timely information than heretofore possible. The equipment being used consists of standard office machines with paper tape and card punching attachments, and the Elecom 50. Point of sale data recording is not included in the paper, although the author hints that the store is looking forward to including such equipment in the complete system. A copy of the address may be obtained from NRDGA, 100 West 31st St., New York 1, N. Y.

"Technical market analysis using a computer"

John Hansen, Melpar
Association for Computing Machinery, UCLA, August 1956

Higher quality, faster reports

The paper describes the use of an electronic computer for speeding up the use of some well-known methods for prediction of stock fluctuations. The computer can analyze all 2000 stocks listed on the major exchanges each day for a very large number of technical formations, thereby saving in manpower, and increasing the number of stocks analyzed and the quality of the analyses. It is possible by these methods to analyze the entire list between the time the market closes and the time it opens the following day.

"Automated hotels speed reservations"

ELECTRONIC WEEK, August 6, 1956, page 5.

Complete guest accounting

Automatic hotel reservations systems similar to those in use by the airlines are being designed by Teleregister. The systems will include processing of all sales information from point of sale to the guest accounts, which will be kept up-to-the-second.

"The electronic computer--top tool in highway design"

ENGINEERING NEWS RECORD, July 12, 1956; pages 30-34, July 19, 1956; page 29.

Labor-saving calculations

Spearheaded by the U. S. Bureau of Public Roads, highway engineers are making use of electronic computers to aid in the design and location of highways, eliminating much of the labor expended in making cross-section calculations and drawings, and other time-consuming chores.

Equipment

"A high-speed parallel adder"

TECHNICAL NEWS BULLETIN, June 1956
National Bureau of Standards

Five steps

The NBS has devised a method for adding two 53-binary digit numbers in 1 microsecond. The addition is completed in 5 steps, during three of which all 52 carries are formed in three groups: of four, then 15, then 31 digits. After all the actual carries are obtained, all the sum digits are formed in parallel during the fifth step in a conventional manner, each by means of the corresponding addend and augend digits together with the carry from the previous digit position.

"An automatic microimage file"

TECHNICAL NEWS BULLETIN, July 1956
National Bureau of Standards

Automatic selection and printing

A microimage data storage and retrieval device has been developed by the NBS which provides rapid access to any one of 10,000 information-containing frames recorded in miniature on a 10-inch-square sheet of microfilm. The instrument automatically searches the microfilm and photographically prints out one frame every two seconds. Input is from a perforated paper tape containing the coded locations of the desired frames in the order in which they are to be printed out. The data comes out on a 10-inch-wide strip of photosensitive paper of any required length, with the individual frames enlarged to ½-inch squares. The paper is developed in the conventional fashion. The equipment is particularly applicable where large volumes of information must be assembled in a pre-determined sequence from a master random file. Information may be in the form of pictures, drawings, fingerprints, letters, numbers, diagrams, etc. The 10,000 frame matrices may be inter-changed, increasing the potential storage capacity infinitely.

"Sorting on a multiple magnetic tape unit"

Wallace Klammer, ElectroData Corporation
Association for Computing Machinery, UCLA, August 1956

Fifty tapes

A description is given of the DataFile Multiple Magnetic Tape Unit, a general purpose storage medium which contains fifty separate 250-foot lengths of magnetic tape within a cabinet. Each tape contains 40,000 words of ten digits each. Magnetic heads move beneath the tapes at high speed, selecting the tape to be read or written upon. Average random access to any tape in the unit is less than a second. Head movement is independent of computer operation. When the head leaves one tape to operate with a different tape, all other tapes remain stationary. When the head returns to the first tape for another operation, the tape will be in the same position it was in after the last operation.

Systems Design

"The machine accountant's approach to systems for automatic computers"

Ned Chapin, Illinois Institute of Technology, Chicago
JOURNAL OF MACHINE ACCOUNTING, August 1956; pages 28–32.

What does management need?

Quality systems analysis is suggested as the service the machine accountant can perform for management--systems analysis "that recognizes that business systems are the blueprint for management. The machine accountant must make management's needs his first concern." To begin a systems analysis for an automatic computer, four questions must be answered:

1. "What information does management need, and in what form does management need it to make better, more accurate, and more timely decisions?" (This is the computer output.)

2. "What raw and semi-processed information is available to work with?" (This is computer input.)

3. "How can the raw and semi-processed information be transformed into the information needed by management?" (How can the problem be programmed?)

4. "How can this new system be successfully installed at a saving in cost...to the company?"

"On the design of business systems for computers"

Ned Chapin, Illinois Institute of Technology
Association for Computing Machinery, UCLA, August 1956

Substitutes for a business model

Systems analysts find two major problems in designing business systems: business is not operated on entirely logical bases, and there is little theoretical framework upon which the analyst can draw. "What is needed... is a theoretical model of business in terms of information flows and transformations, a model that would take into account the internally and externally originating information." For substitutes, the analyst can choose among accounting, feedback, or management science. The advantages and disadvantages of each of these substitutes is given.

Programming

"Problems of scheduling a multiple-job electronic data processing machine"

C. B. Poland III, General Electric Co., Richland, Wash.
COMPUTING NEWS, August 15, 1956; pages 1–3.

Scheduling board keeps everyone informed on job status

Scheduling of jobs on a computer is a time-consuming task. In addition, there is the problem of telling the non-routine customer not only in what priority position his job stands, but also approximately what time on what day it will be completed. The computing center at General Electric in Richland has devised a mechanical aid for job scheduling.

"Pieces of heavy cardboard, five inches high, were cut for each job, using a horizontal scale of two inches to the hour. Thus, a quarter hour pass is ½ inch wide, or a three hour pass is six inches wide. These pieces of cardboard, cut and marked for each routine job, are then placed in a simple aluminum frame which permits them to slide very easily in the horizontal direction. There are six such frames, one for each operating day of the week; included in these cards are the basic preventive maintenance schedules. As non-routine jobs are sandwiched into the schedule, they are placed between already existing routine jobs by simply sliding the cards to the right or left. The frame for each day is calibrated in terms of hours. It is 48 inches long to represent the full 24-hour span of the day. ((The center works on three shifts.)) If, in a given day, cards begin to fall off the end of the frame, it is obvious that the schedule for the day is too tight, and cards which fall off must be placed further down in the week's schedule. This also permits the rapid insertion of month-end jobs, or jobs with a frequency of less than once a week.

"One of the secondary advantages of this system is that any person is able to determine by simple inspection of the board when a job in which he is interested is scheduled to be done. Also, if any major deviation is made in the schedule, all future jobs for the week are immediately re-adjusted to the appropriate time of completion by sliding the cards to the right or left."

"Small business applications using a Univac Computing Center"

Paul H. Rosenthal and Paul A. Hunt, Remington Rand
Association for Computing Machinery, UCLA, August 1956

Program "packages"

Small businesses are being helped to use electronic business systems through the services of the Univac Computing Center in Los Angeles. This Center is developing "packages," uniform computing techniques which may be used by businesses having similar processing requirements. "The packaging is developed from a broad and comprehensive general procedure within which the individual differences of each company can be encompassed. Two packages have been designed for small business. The needs of Fire and Casualty Insurance Companies are included in one package and needs of Insurance Agencies are included in the other." Modifications of the general program to fit each company's needs are not costly.

Comment

Information Retrieval

Problems and research

The quantities of information which man has been able to "timebind" through history appears to accumulate in some sort of geometrical progression. Scientists, librarians, and patent searchers can attest to this! The ability of man to accumulate and store information, however, is far greater than his ability to retrieve specific information from storage. Libraries are discovering that present systems of cataloging are no longer adequate. Scientists find that fields of research overlap with cross-references and interrelationships. The Patent Department spends valuable time searching a forest of possibilities to ascertain the uniqueness of each patent claim.

Since recorded knowledge is composed of man-made symbols, it was inevitable that research in the use of electronic devices in this field of human endeavor be undertaken. The science has divided into such areas as "documentation," "information retrieval," "machine literature searching." The aim, of course, is to utilize the most automatic means possible to catalog and look up information. However, if electronics is to be used, both the information desired, and the directions for finding it must be coded in machine language. And therein lies the difficulty. English is not a logical language! Nor are many other languages logical, since languages have developed from the day-to-day expediencies of the people using them. Translation from one language to another too often requires judgment, a human quality which automatic electronic devices conspicuously lack. Furthermore, languages, especially English, are complicated by idioms, the indiscriminate naming of things, and the haphazard placement of adjectives, verbs, and adverbs in the sentence structure.

Therefore, much of the interest and research in the problem of information storage and retrieval is being devoted to the *logication** of language relationships so that information may be translatable into the mathematical or numerically coded language of electronic devices. One such experiment is the creation of "Ruly English,"** described by Professor Stuart C. Dodd in "Machine Translation of Languages" (John Wiley & Sons) which is being used by the U. S. Patent Office to encode patent information for more efficient manual and automatic retrieval. A description of how Ruly English is being developed and tested for patent searching is given in two progress reports issued by the U. S. Patent Office: "Advances in Mechanization of Patent Searching—Chemical Field," and "Storage and Retrieval of Contents of Technical Literature--nonchemical information." A statement accompanying the reports says in part, "It is hoped that [they] will prove of value and stimulate your interest in our efforts. Further reports will be issued as prog-

* A DPD-created "Ruly English" word! **
** As opposed to unruly English which we normally use

ress continues. Mutual cooperation and consultation with those of similar interests are invited." Those who are intrigued with the problems and possibilities of documentation, and automatic information retrieval will find these pamphlets well worth reading. Copies may be obtained from B. E. Lanham, Deputy Director, Research and Development, U. S. Patent Office, Washington, D. C.

REFERENCES

Books

Machine Literature Searching (Perry, Kent, Berry)
(Reviewed in DPD Aug. '56, pg 7)

Machine Translation of Languages (Locke, Boothe)
(Reviewed in DPD June '56, pg 7)

Articles

"Translation by machine" (Locke) *SCIENTIFIC AMERICAN*
(Listed in DPD March '56, pg 9)

Periodicals

AMERICAN DOCUMENTATION

JOURNAL OF DOCUMENTATION (English)

"Business Data Processing -- A Review"
REPRINTS AVAILABLE
$1.00 ea.

A four-part series of articles on the patterns of business data processing which appeared in June, July, August, October, and December, 1955 issues of DATA PROCESSING DIGEST. To order, write Canning, Sisson and Associates, 914 South Robertson Blvd., Los Angeles 35, Calif.

Training

September 1956 **Dayton, Ohio**	Office Automation, evening classes at University of Dayton, tentatively set for September. For further information write: Mr. Arthur L. Holt, University of Dayton, Dayton 9, Ohio.
September–June, 1956–57 **Pittsburgh, Pa.**	Electronic Data Processing Courses: Data Processing Principles and Methods, Data Processing Laboratory, Business Applications of Data Processing Equipment, Laboratory in Business Applications of Data Processing Equipment, Managerial Aspects of Electronic Data Processing, Individual Research on Data Processing Applications. For information write to Bureau of Business Research, University of Pittsburgh, Pittsburgh 13, Pa.
September 10–21 **Los Angeles, Calif.**	Simulation and Theory of Traffic Flow, University of California at Los Angeles. For information write to University Extension or the Institute of Transportation, University of California, Los Angeles 24, California.
September 11, 1956 **Los Angeles, Calif.**	"Electronic Data Processing: Programming a Business Computer," course number 838ABC, Fall term, UCLA.
September 12, 1956 **Los Angeles, Calif.**	"Design of Data Processing Systems," course number X467AB, Fall term, UCLA. For information on both of above courses, write: University Extension, 10851 LeConte Ave., L.A. 24, Calif. Telephone: BRadshaw 2–6161, Ext. 721.
September 17–21, 1956 **New York, New York**	"Electronic Data Processing for Business and Industry," Hotel Roosevelt. Presented by Canning, Sisson and Associates and Data Processing Counselors. For information write Data Processing Counselors, 130 East 59th Street, New York 22, N. Y.
Sept. 24, 1956 **Philadelphia, Pa.**	"Elements of Electronic Data Processing," Fall semester, Temple University. For information write: Professor T. E. Fitzgerald, Temple University, Philadelphia, Pa.
October 3–5, 1956 **New York City**	"Operations Research, Explained and Applied," seminar sponsored by AMA.*
October 29–November 2, 1956 – Cleveland, Ohio	Special Seminar Program, Western Reserve University, School of Library Science: Machine Literature Searching, Operations Research Approach, Theory of Classification. For information write to Jesse H. Shera, Dean, School of Library Science, Western Reserve University, Cleveland 6, Ohio.
November 15–16, 1956 **New York City**	"Electronic Data Processing for Small and Medium-size Business," seminar sponsored by AMA.*
December 10–12, 1956 **January 7–9, 1957** **New York City**	"'Integrated' Data Processing," seminar sponsored by AMA.*

* For information write: American Management Association, Attention, Franc M. Ricciardi, 1515 Broadway, New York 36, New York.

February 4–8, 1957 **Cleveland, Ohio**	Special Seminar Program, Western Reserve University, School of Library Science: Documentation Survey, Machine Aids to Librarianship, Special Libraries. For information, write as above. (See October 29 listing).
January 30–February 1, 1957 **Cleveland, Ohio**	Operations Research in the Planning of Computer and Data Processing Systems, Case Institute of Technology. For information write: W. W. Abendroth, Operations Research Group, Engineering Administration Dept., Case Institute of Technology, 10900 Euclid Avenue, Cleveland 6, Ohio.

Meetings

September 17, 18, 1956 **New York**	Data Handling Workshop, Instrument Society of America, Hotel New Yorker. Automatic and semi-automatic handling and reduction of data (engineering and scientific data).
September 30–October 3, 1956 **New York City**	National Conference, Controller's Institute, Waldorf–Astoria.
October 18, 19, 1956 **Los Angeles, Calif.**	Meeting of The Institute of Management Sciences, Statler Hotel. For information write: Bob Mellon, Litton Industries, 336 N. Foothill Road, Beverly Hills, California.
October 22–24, 1956 **Philadelphia, Pa.**	International Systems Meeting, Annual Convention of the Systems and Procedures Association of America, Bellevue-Stratford Hotel. For information write to J. A. MacQueen, Alan Wood Steel Co., Conshohocken, Pa.
October 24, 25, 1956 **Chicago, Ill.**	Computer Applications Symposium, sponsored by Armour Research Foundation. For information write: Harold H. Kantner, Computer Applications Symposium, Armour Research Foundation, 10 West 35th St., Chicago 16, Ill.
November 8, 9, 1956 **San Francisco, Calif.**	N.M.A.A. Second Annual Electronic Business Systems Conference, sponsored by the eleven Western N.M.A.A. Chapters; Sheraton-Palace Hotel. For information, write to P. O. Box 3584 Rincon Annex, San Francisco, Calif.
November 15, 16, 1956 **San Francisco, Calif.**	Meeting of Operations Research Society of America. For further information, write T. E. Oberbeck, U. S. Naval Post Graduate School, Monterey, California.
November 15, 16, 1956 **Chicago, Ill.**	Second Annual Automation Conference for senior officers of companies, sponsored by University of Chicago.
November 26–30, 1956 **New York City**	Third International Automation Exposition and Computer Clinic. Trade Show Building. For information, write International Automation Exposition, 845 Ridge Ave., Pittsburgh 12, Pa.

December 10–12, 1956
New York City

Eastern Joint Computer Conference, Hotel New Yorker. Theme: "New Developments in Computers and Components." For information write: Albert J. Forman, Tele-Tech, 480 Lexington Ave., New York 17, N. Y.

February 26–28, 1957
Los Angeles, Calif.

Western Joint Computer Conference, Statler Hotel. Theme: "Techniques for Reliability." For information write: S. D. Wanlass, Systems Research Corp., 13729 Victory Blvd., Van Nuys, Calif.

References

The addresses of publishers and periodicals mentioned in this issue of Data Processing Digest are listed below for your convenience in obtaining further information about the articles or books listed.

Armed Forces Management
208 South Second Street
Rockford, Illinois

Association for Computing Machinery
2 East 63rd Street
New York 21, New York

Banking
12 East 36th Street
New York 16, New York

Computing News
Box 885
Richland, Washington

Engineering News–Record
330 West 42nd Street
New York 36, New York

Journal of Machine Accounting
4025 West Peterson Avenue
Chicago 30, Illinois

Management Methods
22 West Putnam Avenue
Greenwich, Connecticut

N.A.C.A. Bulletin
505 Park Avenue
New York 22, New York

The Office
232 Madison Avenue
New York 16, New York

Office Management
212 Fifth Avenue
New York 10, New York

Personnel Administration
5506 Connecticut Avenue, N. W.
Washington 15, D. C.

Technical News Bulletin
National Bureau of Standards
Supt. of Documents
U. S. Government Printing Office
Washington 25, D. C.

Resource

The following periodicals are reviewed regularly by the publishers of DATA PROCESSING DIGEST for significant information in the data processing and related fields.

The Accountant
Accounting Review
Advanced Management
Aeronautical Engineering Review
American Business
American Gas Association Monthly
Armed Forces Management
Automatic Control
Automation
Aviation Age
Banking
Bell Laboratories Record
Best's Insurance News
Business Week
Chain Store Age
Chemical Week
Computers and Automation
Computing News
Consulting Engineer
Control Engineering
The Controller
Cost and Management**
Credit and Financial Management
Credit Executive
Credit World
Department Store Economist
Dun's Review
Elecom Pulse
Electrical Engineering
Electronic Design
Electronic Week
Electronics
Engineering News–Record
Factory Management and Maintenance
Federation Internationale Documentation*
Fortune
Harvard Business Review
Industrial Quality Control
Instruments and Automation
Iron Age
I.R.E. Proceedings
Journal of Accountancy
Journal of Association for Computing Machinery
Journal of Documentation*
Journal of the Franklin Institute
Journal of Industrial Engineering
Journal of Institution of Production Engineers**
Journal of Machine Accounting
Journal of Society for Industrial and Applied Mathematics
Life Association News
Management Methods
Management Science
Merchants Trade Journal
Modern Railroads
N.A.C.A. Bulletin
Nation's Business
The Office
Office Appliances
Office Equipment News
Office Executive
Office Management
Oil and Gas Journal
Operational Research Quarterly*
Operations Research (ORSA)
Paperwork Simplification
Production
Purchasing
Railway Age
Research for Industry (Stanford Research Institute)
SAE Journal
Scientific American
The Spectator
Steel
Stores
Systems and Procedures Quarterly
Systems Magazine
Tooling and Production
U. S. Investor
U. S. News and World Report
Wall Street Journal
Western Electronic News

* European
** Canadian

DATA PROCESSING DIGEST is published each month by Canning, Sisson and Associates, 914 South Robertson Boulevard, Los Angeles 35, California. Subscription rate: $24.00 per year. Foreign postage (exclusive of Canada and Mexico): $1.00 additional. Single copies: $3.00 when available. Editor: Margaret Milligan.